CLASSICAL CEPHEIDS: CHROMOSPHERIC HEATING AND FORMATION OF THE HELIUM SPECTRUM

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PI: Dimitar D. Sasselov

During the period covered by this report the reduced X-ray data obtained by ROSAT for ζ Gem was used to calculate detailed non-LTE radiation hydrodynamics models of its pulsating atmosphere. The results show that spectral line formation does not follow the kinematics of the gas flow, which has implications to distance determinations. A paper was written and submitted during the period of this report; it will appear in the June 10, 1995 issue of *Astrophys. Journal*.

Currently I am writing the last paper for this project. It makes the connection between the recently revealed difference between non-variable supergiants and Cepheids in terms of their UV flux – based on IUE spectra by Nancy Evans (1994). The difference is difficult to explain, but is in the same sense as the difference between X-ray fluxes of Cepheids and their non-variable counterparts, discovered by our ROSAT project (see Semi-Annual Report, No.1).

During the period covered by this report, the PI was invited to give several colloquia talks based on the findings from this project – at the Institute d'Astrophysique, Paris; University of Oslo, Norway; Observatoire Haute Provence, France; University of Montpellier, France; and at the Center for Astrophysics, Cambridge.

PAPERS:

1. "ROSAT Observations of Classical Cepheids: ζ Gem", by D. D. Sasselov & C. N. Sabbey, *Revista Mexicana de Astronomia y Astrofisica*, **29**, 215, 1994.

2. "On Spectral Line Formation and Measurement in Cepheids: Implications to Distance Determination", by C. N. Sabbey, D. D. Sasselov, M. S. Fieldus, J. B. Lester, K. A. Venn, & R. P. Butler, *Astrophysical Journal*, June 10, 1995, in press.